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The Effect of the fluctuation of the Chinese Yuan on the returns of stocks traded in the Kenyan, Ugandan and Tanzanian markets

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Declaration

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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Abstract

This paper investigated the relationship between Kenya, Tanzanian and Ugandan exchange rates and the returns of three stocks traded in all three markets. The exchange rates analyzed were from the three countries versus the Chinese Yuan. The data was maintained at weekly intervals and the time period was from January 2012 to December 2017. In this study, both the exchange rate and the stock returns data were found to be non-normally distributed. A unit root test (Augmented Dickey-Fuller) found that both time series were stationary at level form. A test into the causal relationship between the two variables by the Granger Causality test showed that there was a unidirectional relationship between stock returns and the exchange rates that run from the stock returns to the exchange rates. Understanding the flow of influence between exchange rates and stock market returns is essential as the two variables have become important aspects in trading markets. The information about this relationship between stock market returns and exchange rates would help investors to invest prudently by reducing their exposure to risk.

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Dedication

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Chapter 1

Introduction

1.1 Overview

Policy makers emphasize on the importance of achieving a stable exchange rate especially in developing economies. A fluctuating exchange rate results in an unstable economy as the pricing of goods and services becomes difficult. When a foreign country's exchange rate appreciates as compared to the local currency, the local country would need to pay more for its imports and receive less for its exports. This affects the country's economy as trade imbalances affect foreign currency loans, imports and reserves. When a country's export levels decrease, the real GDP slows down as the demand for goods and services decreases. This results in the reduction of jobs, thus a negative multiplier effect on the economy. Exchange rate fluctuations can also affect an investor's investment portfolio. When a country's stocks are valued in foreign currency, if the foreign currency appreciates, it affects the earnings for domestic producers. If an investor invests in securities that are valued in a currency that is strengthening, it can boost their returns. Although there exists substantial research that focused on how exchange rate volatility has a direct effect on different aspects of a country's economy, further evidence is needed to provide more information for the management and improvement of exchange rate policies. One aspect of the economy that is directly affected by exchange rate volatility is the stock market. Studies by Agrawal, Srivastav and Srivastava (2010) and Mlambo, Maredza and Sibanda (2013) have examined exchange rate fluctuations and its effects on the performance of stock markets in developing countries. These studies have provided valuable information for the management of exchange rate regimes. How trade flows are affected by exchange

rate volatility has become an important subject on a macroeconomic level, with a lot of research behind it. On the other hand, on a microeconomic level, empirical evidence that is available is not enough for generalization into different markets.

A study conducted by Hau and Rey (2006) was significant in developing a framework used to determine exchange rate returns and capital inflows. Their research was fueled by the need to explain how determining an exchange rate can improve the performance of equity returns. The paper suggests that currency order flows and portfolio flows have a very close relationship as they both reflect how an investor would behave. Dornbusch and Fisher (1980) suggested that changes in the exchange rates affect the competitiveness of a firm as exchange rate movements affect the value or earnings and the cost of funds. A lot of firms borrow in foreign currencies in order to finance their operations. When a local currency depreciates, it makes exporting goods profitable to investors, resulting in an increase in the demand for foreign goods, making the firms revenues and value appreciate, leading to high stock prices. A local currency increasing in value, on the other hand, leads to a decrease in the demand for foreign products, decreasing the profitability of exportation and results in low stock prices.

The underlying idea is that exchange rate volatility increases transaction costs and this reduces the gains that would be earned from exports. Studies have shown that the uncertainty that comes with exchange rates negatively impacts the performance of foreign owned firms. Nath and Samanta (2003) state that: a developing stock market attracts capital flows from foreign investors, which increases the demand for local currency. When stock prices are falling, investors would try to sell their stocks to avoid losses and exchange the money to foreign currency to move out of the country. This would create a demand for foreign currency and as a result the declining stock prices would result in a depreciation of exchange rates. This study hinted at a possible bidirectional effect between stock markets and exchange rates. From the breakdown of the Bretton Woods system in 1973, many countries' exchange rates have been fluctuating. The international business community claims that exchange rates are one of the most important factors in a firm's foreign direct investment decision. This is because when a country's currency is devalued, it can give foreigners an edge in buying the country's assets. Given the lack

of evidence in the traditional theories, a lot of work has recently been done in exchange rate movements and foreign direct investment however, there is still no consensus either in theory or empirical studies.

This research looked to analyze if a country's exchange rate had an effect on the returns of stocks. The focus was on the influence that China has on East Africa's economy, due to the loans and investments it has injected over the past few years.

1.2 Background to the Study

Over the years, China's rapid population and economic growth has prompted the need for resources to sustain her expanding middle class population. The country is focused on being able to secure a long lasting energy supply for its industries and therefore, looks for a quick access to oil and other raw material supplies around the world. For this need, China, according to Wbur (2018), has in a great way, turned to Africa to satiate this need. Africa is known for her security and political risk and China has capitalized on this through investments, as per Kaiman (2017). It has boosted the African oil and mining sectors, transport and infrastructure, among other sectors, in exchange for trade deals that give them an upper hand. Through this interest in Africa, China has become Africa's largest trading partner since 2009, surpassing the United States of America. The Conversation (2015) states that approximately 200 billion US dollars of goods and services flowed between China and Africa in 2013, which was twice the 85 billion US dollars in trade the US had with the continent. China contributes sixteen percent of sub-Saharan Africa's imports and contributes fourteen to twenty one percent of exports from the region. Data from Brookings (2017) shows that most of the exports from China into Africa are manufactured goods, while the exports into China from Africa are minerals, fuels, lubricants, raw metals and other commodities.

China's economy has had a growth rate of ten percent for the last three decades. It therefore needs substantial levels of energy in order to sustain its development. The country has surpassed the United States of America as the world's largest importer of oil in recent years, and will become the world's largest consumer by 2030, according to

Bloomberg (2016). China engages in commercial diplomacy and agreements that cannot be matched by other countries. The Chinese seem to have a greater realization of the urgency that a lot of the African countries have for development. China has ensured that she has a greater share of the businesses they invest in, in Africa, by offering finance at lending rates that cannot be rivaled, in the form of loans and credits from her banks. Chinese banks, contractors and the government have loaned more than eighty six million US Dollars to Africa. These loans raise questions about the level of debt that African countries have and the effects that they will have on the economies. Opinion surveys have shown that African countries' governments and companies see China in a great light in terms of influence and her contribution to the continent's development. A 2016 poll by Afrobarometer showed that many African leaders are receptive to the benefits of Chinese investment to their countries' development. Although Chinese investment in Africa has spurred growth, China's economic slow-down and the drop in commodity prices has limited the growth rates. The GDP in Sub-Saharan Africa was at five percent in 2011 but was set to drop to 1.4% in 2016.

In 1999, the annual volume of trade between China and Africa was 5.6 billion US Dollars. It increased significantly by 2004 when China-Africa Cooperation Fund (CACF) was established. Although the volume of trade between the United States and Africa has also increased, the Sino-African trade is growing at a faster rate of more than fifty percent every year. Sub-Saharan exports to China have grown faster than its imports from China. This shows a positive trade balance between the two regions. Tanzania has been a major recipient of Chinese investment. Between 2012 and 2013, the number of Chinese private firms operating in Tanzania increased from 30 to 300, with the total stock invested rising to 541 million US Dollars. Most Chinese private firms involve themselves in industries that require low technology but are very labor intensive. They provide on the job training, which has created more than 1400 jobs. In Uganda, the Chinese were not well received at first as they provided cheap goods, which posed a threat to local businesses. When Ugandans finally appreciated the Chinese investors, it was their opinion that the investments contributed more to the socio-economic development of the country, rather than benefiting the Chinese alone. The Ugandan Investment Authority stated that the trade volume between china and Uganda increased from 156 million to 222 million

US Dollars in 2014. It experienced a growth rate of 42%. In 2011, in Kampala, traders accused the Chinese traders of causing the prices of fuel and commodities to rise and the unstable exchange rates. Kenya's exports to china went up from 32 million to 75 million US Dollars from 2009 to 2014, while its imports went from 0.96 trillion to 2.8 trillion US Dollars. In addition to that, there are many projects that were introduced by the Chinese government together with the Kenyan government from the construction of roads, among other infrastructure. As stated earlier, investing in stocks that are dominated in a currency that is appreciating boosts total returns, while investing in stocks dominated in a depreciating currency reduces total returns. Noting the influence that China has on East-Africa, this paper focuses on the Yuan exchange rate as these three countries receive substantial aid in the form of infrastructure, loans and foreign direct investment from China. If a country's exchange rate is weak, it pushes up the rate of inflation for a country that imports a lot of goods. When the Yuan exchange rate depreciates, it will drive down East-Africa's stock prices, hence low returns, as the demand for its foreign products will fall.

Kenya, Uganda and Tanzania have followed somewhat similar paths politically, and also share a common colonial background. Their people share common boarders and, before the fall of the East African Community (EAC) in 1977, shared common services from the colonial period. The EAC was later revived in 1999. China has, to a very large extent, been investing heavily in Africa through increased trade, foreign direct investments and loans since the early 2000s. It has become Africa's largest trading partner. The continent has become well supplemented with roads, schools, hospitals and other infrastructure and loans "with no strings" to the respective governments from the Chinese. This has led to the assumption that there is a great inter-dependence between the two regions: China's need for Africa's natural resources and Africa's need for economic and infrastructure development. It is therefore important to assess the influence of the Chinese currency fluctuation on the returns of stocks traded in the region's markets.

1.3 Problem Statement

Africa has been a key focus when it comes to China's trade and economic strategy. East Africa has been identified by investors as one of China's entry points into Africa. East Africa is a war/conflict-free region with stable political environments, making it an ideal starting point for the expansion of Chinese investors. China offers favorable loans to the region, builds schools and hospitals to the rural areas and has been at the fore-front of developing infrastructure. Kenya Airways, for example, one of Africa's leading airlines, was granted landing rights and therefore offers direct flights to several major Chinese cities. Kenya Airways also has many direct flights to a number of African countries. Such investments into East Africa by China will boost the region's economy by enhancing the earnings of different sectors from tourism to trade. According to the Economist (2015), these investments also facilitate the migration of the Chinese into East Africa, which results in the increase of foreign direct investment.

This Sino-East Africa relationship discussed earlier shows that China benefits from the resources it gets from East Africa while Kenya, Uganda and Tanzania benefit too from the investments and infrastructure developments. Although the three countries benefit in a great way, the balance of trade looks to be biased towards the Chinese in that, the countries' export to china less than they import from them. The debts and loans that the governments receive from the Chinese are also increasing. The questions of how these countries will pay the debts arise, and if the currencies fluctuate, how this affects the repayment of the loans. Will the exchange rate fluctuations have an effect on the prices of stocks and its returns as we have seen that: a stock market attracts capital flows from foreign investors, which increases the demand for local currency, and that falling stock prices lead to the depreciation of exchange rates? According to Kodongo and Ojah (2014), international investors with returns in foreign currencies find it important to adjust their returns for currency risk. If the monetary policies achieve stable inflation rates, real exchange rates would be stable and therefore, international investors would not be concerned with currency risk, leading to the increase in demand for the local currency, thus an increase in stock returns.

This paper analyzed the relationship between the fluctuation of the Chinese Yuan and the volatility of the stock returns in Eastern Africa. The need for this study stems from the idea that it is important to analyze the stock market to understand how a country's exposure to the outside world is felt. China's growing influence in the region and the loans to these countries ensures that Kenya, Uganda and Tanzania are largely dependent on its economy. When a country's currency is stable, it encourages foreign investments as there is an increase in the demand for that currency. This results in high interest rates, which affect the returns of a stock by making stock prices fall. One would expect that fluctuations in China's currency, due to the influence it has over the region, would have an effect on the prices and thus returns of stocks in these markets.

1.4 Research Objectives

1.4.1 Main Objective

To investigate the effect of the fluctuation of exchange rates on the returns of similar stocks traded in different markets.

1.4.2 Specific Objectives

- Analyze the performance of three economies and their exchange rates during the period January 2012 to December 2017.

The three stocks were chosen as they have large market capitalization in the region of study.

Company	**Kenya**[1]	**Uganda**[2]	**Tanzania**[3]
EABL	181.88bn KES	6,924.02bn UGX	1133.13bn TSH
KCB Group	144.87bn KES	5,114.81bn UGX	1,811.91bn TSH
Kenya Airways	66.59bn KES	1,960.09bn UGX	50.48bn TSH

Table 1.1: Companies' Market Capitalization

[1] Financial Times (2018); [2] Uganda Securities Exchange (2018);
[3] African Markets (2018)

This makes it easier for comparison and generalization of the results because of the size of the stocks. The EABL was started in Kenya as Kenya Breweries. It then acquired financial holdings in Uganda and Tanzania. This gave the firm a controlling hand in the brewing industry in East Africa. KCB Group was founded in 1896, and now is one of the major banks with branches all over East Africa. Kenya Airways also is one of Africa's leading airlines, which offers direct flights to most of the Chinese cities from the East African region.

- Find whether a relationship exists between the exchange rates movements and stock returns.

Exchange rate fluctuation is an indication of high exchange rate risk and therefore gives a precise estimation of the relationship between the exchange rate and the stock markets for the stated period. When the exchange rate is not stable, the investors will desire an extra compensation when investing in stocks valued in the risky currency. This extra price that is included, may explain the difference in stock returns with the fluctuation of the exchange rate.

1.5 Significance of the Study

The relationship between exchange rates and stock returns is a big issue that has been in the minds of investors. Different researchers have proved from their studies that exchange rate is the main determinant of business profitability. They have provided evidence that a firm that specializes in exporting its products and services makes more profit when the domestic currency is weak.

This study of the effect of the movement of the Chinese Yuan on the returns of stocks traded in the Kenyan, Ugandan and Tanzanian markets, will provide information for management decisions about risks and investments. This information will be beneficial for the implementation of government policies as a stable exchange rate promotes a strong economy through foreign direct investments.

This study aims to increase the predictability of stock returns especially for the benefit of investors who may be interested in the region by offering a different perspective

on the interdependence of these three nations in trade.

The organization of the paper is done as follows: Chapter 2 contains a literature review. Approach and methodology are presented in Chapter 3 while Chapter 4 will have the results and discussion of the results. Chapter 5 contains the conclusion to the study and recommendations.

Chapter 2

Literature Review

Although a large number of researchers have studied the relationship between stock markets and foreign currency markets, most of them have failed to show if one variable affects the other. Recently, most research has been aimed towards studying the relationship between the stock market and the foreign currency markets. The results, although most of them did not show a significant causal relationship between the two variables, varied from study to study. Since then, macro economic variables, such as interest rates, have been incorporated into different models in order to assess the effects of exchange rates on stock markets and vice versa, but did not yield different results.

Stock markets act as financial intermediaries between developed and under developed countries and, as a back bone for developing countries. Under developed countries need more resources than developing countries. Alile (1984) states that although capital resources can be found through issuing shares, it all depends on how big the market is. The theory behind this paper was considered as, one could generalize the economic conditions of a developed country in the 1980's to present economic conditions in a developing country. As the stock market is seen as the backbone for developing countries, the impact of the exchange rate on stock markets, which is implied in the arbitrage pricing theory, differs between countries. In this case, China is more developed than Kenya, Uganda and Tanzania although it requires more resources than the three. This paper therefore cannot be generalized to fit into this context.

A study of the dynamic behavior between India's stock market and exchange rate using

the VAR model by Chakrabarti (2001), found that the stock market and the exchange rate had a negative relationship. On the other hand, GARCH models showed a positive relationship between exchange rates and stock prices in the paper by Chouy (1996). His paper looked at the time varying macroeconomic conditions and stock prices in India.

In his research, Abdul (2002) found that the exchange rate was affected by a financial crisis, which then affected the stock market. In this, the impact of the exchange rate on the stock market was different and so, the unit root test found that exchange rated and stock markets were integrated at level 1.

Aggarwal (2003) investigated the effects of stock exchanges and the performance of market stocks in Bangladesh. His findings showed that the exchange rate and stock prices were non-stationary. The Johansen procedure showed no co-integration between the two variables. Furthermore, the Granger causality analysis showed that stock prices granger caused the volatility of the US dollar exchange rate and Japanese Yen but there was no relationship between the exchange rate of the Euro and the Pound. Similar results were obtained before by Ajayi and Friedman (1989). Their paper found no integration between stock prices and exchange rates using the Johansen procedure.

Doong and Yang (2005) tested for the existence of a causal relationship between exchange rates and stock returns of the Colombo stock exchange and used Augmented Dickey Fuller (ADF) test to find out data series stationarity. The regression results showed a significant relationship between the two variables. Research shows that regression analysis and granger causality tests often yield contradicting results.

Nieh et al. (2006) investigated the relationship of the stock prices and exchange rates in Kenya. The theory behind their study was that stock prices and exchange rates had no proper direction. Using Pearson product moment correlation coefficient, to determine the degree of correlation between the two variables, they found that there was a positive relationship between exchange rates and stock prices.

Mishra et al. (2007) study on the Asian financial crisis showed that the fluctuation

of currencies has an effect on the exportation and importation of goods and services. Their results also express that it is possible to predict future trends in stock markets. Theory explains that a change in the exchange rates affects a firm's foreign operation and its profits. This in turn would affect the stock prices. A decline in the stock market will push investors away to look for profits elsewhere; this movement decreases the demand for money, which pushes interest rates down, causing further a further decline in investments, leading to depreciation in the currency.

Kodongo and Ojah (2014) sought to establish whether Africa's currency volatilities affected the equity risk premia. Their results showed that there was strong evidence of conditional, time varying currency risk premia. They also found that investors are concerned about Africa's equity markets and they incorporate the impacts of low trading on their pricing calculations.

The relationship between exchange rate and stock market may be different depending on the geographical area, economic conditions, relations with international world, domestic conditions, among other factors. The inconsistency in the results between the different countries might be due to the trade volume, equity, economic relations and risk assessment. Allen et al. (2011) found that stock markets in Africa performed well, and realized positive returns in some markets, on a risk-adjusted basis during the 2007/8 financial crisis. When exchange rates are volatile, international investors can earn negative returns on the foreign assets. This means that they would ask for a premium payment with the perceived level of risk of the fluctuation of exchange rates.

Traditional approaches suggest that there is a positive relationship between stock market and exchange market when the local currency depreciates as local firms become more competitive leading to an increase in the exports. This results in an increase in stock prices. Asset market approaches propose that there is little or no interaction between the exchange market and the stock market because the variables are affected by different factors. The portfolio balance approach suggests that the increase in the demand for a local currency forces the interest rates to go higher, thus attracting foreign investors. This would result in an appreciation of the exchange rate of the local currency against

the foreign one, suggesting a negative relationship between the variables.

Past studies on the relationship between exchange rates and stock market prices used mostly very volatile exchange rates. These may have resulted in results that cannot be adapted to different economies. According to some studies, exchange rates are not correlated with stock market returns. Others supported the evidence of weak correlations. This result may be because of the double exchange rate risk included both in stock market returns and exchange rate terms.

Although theoretical explanations may seem obvious, empirical results on the relationship between exchange rates and stock market returns have been mixed and the existing literature does not provide a conclusive answer on the issue of causality. Some suggest that exchange rate fluctuations positively affect stock markets while others find negative exposure estimates. Others find no evidence on the impact of exchange rate volatility on stock market returns. This research looks to solve this problem by narrowing its concentration to similar stocks in different market, and concentrating on the local currencies involved versus the Chinese Yuan.

Chapter 3

Research Methodology

3.1 Approach and Methodology

The main aim of this study was to test whether there was a relationship between exchange rate volatility and the movement of stock returns. The study focused on the returns of three stocks: EABL (East Africa Breweries Limited), KQ (Kenya Airways) and KCB (Kenya Commercial Bank), in three countries, and the Yuan-Kenyan Shilling, Yuan-Tanzanian Shilling and Yuan-Ugandan Shilling exchange rates. The frequency of the data was maintained at weekly level from January 1^{st} 2012 to December 31^{st} 2017. The span of the data was maintained at weekly intervals as the data would be more precise and therefore make it easier to analyze the dynamics between exchange rates and the stock returns. The stocks used are from listed companies in all the three countries, which have large market capitalization in these markets. The two sets of data were matched by calendar dates. The stock price data was taken from Bloomberg while, the exchange rate data was taken from Oanda. Figures 13 to 21 show line plots of the time series data between the exchange rates and the stock returns from all of the three markets.

The weekly stock returns and the exchange rates were calculated by taking the natural logarithms of the daily closing prices, where P_t is the closing price of the t_{th} day for the stock prices and, E_t is the exchange rate on the t_{th} day. Using the natural logarithms minimizes the time series' variation by de-trending the data. This also makes it easier to fit into models.

$$r = ln(P_t/P_{t-1}) \tag{3.1}$$

$$d = ln(E_t/E_{t-1}). \tag{3.2}$$

The behavior of these returns were observed and tested for the objectives of the study using EViews and R programs.

3.1.1 Test for Normality

First, a test to find out the nature of the data, independently, was needed to check for normality. The Jarque-Bera statistic checks for skewness and kurtosis to find out if the data is normally distributed. It is an asymptotic test that caters for large samples of data.

$$JB = n[\frac{S^2}{6} + \frac{(K-3)^2}{24}] \tag{3.3}$$

Where

- n = sample size,
- S = skewness coefficient,
- K = kurtosis coefficient.

For a normally distributed variable, $S = 0$ and $K = 3$. The test is therefore a joint hypothesis that S and K are 0 and 3, respectively.

3.1.2 Test for Stationarity

A test of the condition of stationarity was essential in order to assess the interaction between the stock returns and the exchange rates for each country. When a time series data's mean and variance are constant over time and the value of the covariance between two time periods only depends on the lag, the data series is then said to be stationary. A time series data can be tested for either stationarity or non-stationarity condition using the Augmented Dickey Fuller (ADF) test as it is more appropriate for large samples of data. This research assumed that the data from the two variables was stationary. A unit root test was computed to check for stationarity. By assuming that the time series follows AR (p) the ADF test corrects the original Dickey Fuller test's parameters for

higher orders. This is done by adding lagged difference terms of the dependent variable on the right side of the regression.

$$\Delta Y_t = b_t + \beta Y_{t-1} + \mu_1 Y_{t-1} + \mu_2 Y_{t-2} + ... + \mu_p Y_{t-p} + e_t \tag{3.4}$$

Where:

- Y_t is the time series value
- b_0 is the intercept term
- β is the coefficient of interest in the unit root test
- μ_i is the parameter of the augmented lagged difference of Y_t that represents the p^{th} order autoregressive process
- e_t is white noise.

3.1.3 Granger Causality Test

If the time series is non-stationary then a test on co-integration would be done to test for causality between the variables. The Granger causality test was done to test whether there was an effect of one variable on the other. A time series x Granger-causes another time series y if y can be accurately predicted by using x's past values. The Granger Causality test was applied to confirm the stationarity of the pairs of variables. According to Engle and Granger (1987), a vector auto-regression in the first difference is unspecified if two non-stationary data sets are co-integrated. An appropriate lag length would also be determined for each pair of the variables. The vector auto regression (VAR) lag order selection was used for this in EViews.

$$\Delta X_t = \alpha_1 + \sum_{i=1}^{m} \beta_i \Delta X_{t-i} + \sum_{j=1}^{n} \delta_i \Delta Y_{t-j} + \varepsilon_{1t} \tag{3.5}$$

$$\Delta Y_t = \alpha_2 + \sum_{i=1}^{m} \gamma_i \Delta X_{t-i} + \sum_{j=1}^{n} \phi_i \Delta Y_{t-j} + \varepsilon_{2t}. \tag{3.6}$$

Chapter 4

Research Results

4.1 Results

Following the existing literature and the objectives of this study, the following hypotheses were formulated in order to study the nature and behavior of the two variables in question. These hypotheses would help to tackle the objectives of the study. The main objective was to investigate the effect of the fluctuation of exchange rates on the returns of similar stocks traded in different markets.

- Hypothesis 1: The exchange rate returns and stock returns are normally distributed.
- Hypothesis 2: A unit root exists in both series, suggesting non stationarity.
- Hypothesis 3: Exchange rates do not Granger cause stock returns.

The following are the results of the tests that were carried out, followed by an explanation of the results.

Table 4.1: Jarque-Bera Test Results

Data	X-squared	df	P-value
Exchange Rates			
CHYKES	42.504	2	5.892e-10
CHYTSH	38876	2	2.2e-16
CHYUGX	120.25	2	2.2e-16
Stock Prices			
KQ	34896	2	2.2e-16
KQTZ	96374	2	2.2e-16
KQUG	3774.482	2	2.2e-16
KCB	83.22	2	2.2e-16
KCBTZ	100110	2	2.2e-16
KCBUG	91959	2	2.2e-16
EABL	22.554	2	1.266e-05
EABLTZ	371660	2	2.2e-16
EABLUG	230290	2	2.2e-16

Table 4.2: Augmented Dickey-Fuller Test Results

Data	Dickey-Fuller	Lag Order	P-value
Exchange Rates			
CHYKES	-6.1164	6	0.01
CHYTSH	-5.3772	6	0.01
CHYUGX	-5.7386	6	0.01
Stock Prices			
KQ	-7.7761	6	0.01
KQTZ	-6.8169	6	0.01
KQUG	-7.4141	6	0.01
KCB	-6.0382	6	0.01
KCBTZ	-6.5607	6	0.01
KCBUG	-5.7501	6	0.01
EABL	-7.7841	6	0.01
EABLTZ	-6.768	6	0.01
EABLUG	-6.6463	6	0.01

Table 4.3: Granger Causality Test Results

Data	Model	Res Df	Df	F	Pr (>F)
CHYKES ~ KQ	1	309			
	2	310	-1	0.2658	0.6066
CHYKES ~ KCB	1	309			
	2	310	-1	0	0.996
CHYKES ~ EABL	1	309			
	2	310	-1	1.3053	0.2541
CHYTSH ~ KQTZ	1	309			
	2	310	-1	0.0146	0.9038
CHYTSH ~ KCBTZ	1	309			
	2	310	-1	1.5877	0.2086
CHYTSH ~ EABLTZ	1	309			
	2	310	-1	0.0401	0.8414
CHYUGX ~ KQUG	1	309			
	2	310	-1	0.083	0.7734
CHYUGX ~ KCBUG	1	309			
	2	310	-1	0.0081	0.9283
CHYUGX ~ EABLUG	1	309			
	2	310	-1	1e-04	0.9925

4.2 Discussion of Results

In 2013 the Gross Domestic Product (GDP) in Kenya increased to 4.7%, being supported by stable macroeconomic conditions. Low inflation rate was as a result of the improved supply of food, low international oil prices and lower electricity costs. The smooth 2013 elections also highlighted political stability and increased investors' confidence. In the tourism sector, the number of tourists initially decreased due to the travel advisory against Kenya due to terrorist attacks (Westgate Mall in September).The banking sector saw the enactment of the Prudential and Risk Management Guidelines and the Finance Act. The Kenyan shilling however remained stable against global currencies. The Tanzanian GDP was at a growth rate of 6.7%, which was better than regional economies especially during the global economic crisis. The fiscal deficit declined in 2012/2013. Despite these macroeconomic growths, agricultural production had slowed down with the job creating sectors like mining and telecommunications failing to provide employment thus, failing to reduce poverty. The enactment of the Finance Act in the banking sector introduced an excise duty on money transfers through banks or any financial institution. Uganda recorded a real GDP growth of 5.5%, which was supported by high public and private investments and a growth in domestic demand. Projected growth was expected to be driven by investment in infrastructure and the demand for investment. The reducing inflation rate was as a result of falling food prices from good harvests and the decline in oil prices. The Ugandan shilling depreciated against global currencies because of net outflows of portfolio investments due to market expectations, increased telecommunication investment demand and the strengthening of the US dollar.(KCB Annual Report, 2013)

In 2015, the GDP in Kenya was estimated at 6.9% that was a result of government expenditure on infrastructure and improved rainfall. The tourism sector also recovered from the previous year's downfall. Despite the challenges during the year, the Kenyan shilling continued to be very volatile while interest rates continued to increase. The Monetary Policy Committee raised the Central Bank Rate, enabling Kenyan Shilling to recover and stabilize. The banking sector was placed under scrutiny after the fall of two banks due to unsound banking practices. This also led to more requirements and guidelines being set. In Tanzania, the GDP continued to rise to 7.1% with the key drivers being informa-

tion and communication. Inflation increased towards the end of the year because of food prices, transport and utilities. The foreign exchange market volatility and the Tanzanian shilling depreciated by almost 29%. Tanzania continued to maintain a stable fiscal position while keeping the deficit at levels that could be sustained. The elections in that year saw efforts to diversify the economy and prudently manage government resources. In Uganda, the economic activity grew by 5%. The estimated growth was expected to be slowed down by lower levels of exports and slow economic recovery. Exchange rate depreciation and increased power tariffs led to increased inflation. The Ugandan shilling depreciated 21.8% due to the continued strengthening of global currencies.(KQ Annual Report, 2016)

In 2017, the economic growth in Kenya was greatly affected by the electioneering period and drought. Overall growth dropped from 5.8% to 6.7%. The capping of interest rates also affected the credit sector. Other sectors apart from agricultural, manufacturing and financial however, posted higher growth rates. The Kenyan shilling remained stable. The Monetary Policy Committee benchmark was maintained at an interest rate of 10% despite the conditions. In Tanzania, the economy maintained a stable growth rate from 2015 driven by the mining and the communication sectors, which contributed 26.3% and 13.1%. Inflation increased by a small margin due to an increase in food prices and non-food item prices. In Uganda, the growth was driven mainly by public infrastructure investments and the recovery of its manufacturing and construction sectors. Low commodity prices due to slow growth in the international markets and tough global financial conditions meant that the balance of payments deteriorated. The major risks to economic performance that the country faced included low commodity prices and demand for its exports to major markets. The tough financial conditions discouraged foreign direct investments while local shocks like high public expenditure reduced domestic revenues. (KCB Annual Report, 2017)

The Jarque Bera test's null hypothesis, as was stated at the beginning of this section, is that the variables are normally distributed. The p-values in Table 4.1 reflect the probability of accepting the null hypothesis. When the p-values are very low, the null hypothesis would be rejected. The confidence level was set at 5%, whereby the null hypothesis would

be rejected if the p-values fall below this level. In the data analysis, the p-values are all below 5% confidence level. These values are too low such that, the null hypothesis can be rejected. The descriptive statistics for the two variables are displayed in Table 4. A skewness value of 0 and kurtosis value of 3 shows that the data is normally distributed. A high or low kurtosis value indicates that the data is extremely leptokurtic or platykurtic (Parkinson 1987). From the analysis, the skewness for the stock returns and the exchange rates are below 0, except for KQ, KQUG, KCBTZ, KCBUG, EABLTZ and EABLUG with extremely high skewness values. The Kurtosis values are extremely above 3, showing that the variables are extremely leptokurtic. These results show that the exchange rates and stock returns are non- normally distributed as the Jarque-Bera values are very large. The first hypothesis that the exchange rates and stock returns are normally distributed is therefore rejected.

An Augmented DickeyFuller test (ADF), tests the null hypothesis that a unit root exists in a time series. After finding out that the two variables are non-normally distributed, the second step was to analyze the stationarity of the data. A time series is said to be stationary if the mean and variance are constant over time. The stationarity of data may also be observed by studying time series graphs of the variables and checking for the mean, variance and autocorrelation. If the plots do not trend upwards or downwards, then this would mean that the mean and variance are constant. These graphs are displayed in Figures 1 to 12. If a unit root exists in the Augmented Dickey-Fuller test, then this means that the time series data is not stationary. If the p-value is less than or equal to the significant level (5%), the null hypothesis would be rejected. The results of the ADF test are displayed in Table 4.2. In this data set, it is seen that the p-value for both the exchange rates and the stock returns are in the negatives. This is below the critical values even at 1%. This leads to the rejection of the null hypothesis for both sets of data, which suggests that this data is stationary. Vertical fluctuations in the plots of the graphs also are an indication that the variance is constant. It can be concluded that, according to the ADF test statistics, stock returns and exchange rates are stationary. Looking back at the literature review, where some similar studies conducted the Johansen Co-integration test to test for long-term relationships, this test would not be useful in this context due to the stationary nature of the data. The second hypothesis that a unit root exists in

both time series data is therefore rejected.

The third step was to find out whether one variable could Granger cause the other variable, by running a Granger Causality test. If a variable X "Granger-causes" a variable Y, then past values of X should contain information that could help predict Y beyond the information that is contained in the past values of the Y variable alone. The results of the Granger Causality test are outlined in Table 4.3. If Pr(>F) value is less than the significance level, then the null hypothesis, that variable X does not Granger Cause variable Y, is rejected. This is an indication that Model 2 is more restrictive as compared to Model 1.If the opposite is true, the null hypothesis would not be rejected as it shows that Model 1 is more preferred to the restrictive Model 2.

From the data analysis conducted, the Granger Causality test results show that the F-values for the relationships between CHYKES-KQ, CHYKES-EABL, CHYTZS-KCBTZ and CHYUGX-KQUG are above the 5% critical level. This means that the null hypothesis, that exchange rates do not Granger cause stock returns, cannot be rejected for these relationships. However, the null hypothesis that stock returns do not Granger cause exchange rates is rejected. On the other hand, for the other relationships (CHYKES-KCB, CHYTZS-KQTZ, CHYTZS-EABLTZ, CHYUGX-KCBUG and CHYUGX-EABLUG), as the F-statistic is below the significance level, we can fail to reject the null hypothesis. However, a low F- statistic value that results in a p-value that is above 0.05, as is the case with these relationships, indicates that the null hypothesis, that X does not granger cause Y cannot be rejected.

From the above Granger Causality test results, it can be concluded that a large F-statistic indicates that stock returns granger cause exchange rates. A low F-statistics that results in high p-values also indicate that stock returns Granger cause exchange rates. In other words, the causality is unidirectional, running from stock returns to exchange rates.

Chapter 5

Conclusion

This research focuses on the dynamic relationship between stock market movements and the volatility of exchange rates. Data analysis started with taking the logarithms of the stock prices and exchange rates in order to get the stock returns and exchange rate returns. Using the logs of these variables for analysis makes it easier to test the data for normality. Statistics yielded from the application of the Jarque-Bera test, showed that the time series data was non-normally distributed. The next step was to check for the stationarity of the two time series. This was done by conducting the Augmented Dickey Fuller test whose results show that both data series are stationary at level form. The Granger causality test was carried out to find out the direction of influence between exchange rates and stock returns. The results depicted a unidirectional causality that runs from stock returns to exchange rates. This means that when a stock's returns decrease, the exchange rates returns would increase. The opposite influence was however not found to be true.

5.1 Recommendation

The main objective of this study was to examine how the fluctuations of the exchange rates affect a stock's returns in East-Africa. The findings of this research were that there was a very weak relationship between exchange rate volatility and the stock market. However it was found that the stock market does have an influence on the exchange rate. An investor holding foreign equities will be exposed to exchange rate fluctuations. The basic theory was that, when stock prices are falling, foreign investors would try to sell

their stocks to avoid losses and convert the money to foreign currency. This would create a demand for foreign currency and as a result the declining stock prices would result in a depreciation of exchange rates. Policy makers would be concerned about the relationship between stock returns and the exchange rate as it would generate fluctuations in the exchange rate and investment in the stock market. The movement in stock market can, to a great extent, affect a country's economy. The adjustment in a stock's price can cause an economic disruption, which if sustained can lead to a market crash, just as 1929 stock market crash. Past market movements showed that, when prices fall, the policy makers would cut interest rates fearing a market crash, leading to a recession. When domestic equity markets rise, the country's confidence increases as well, this encourages foreign investments. This leads to an increase in the demand for the local currency against other currencies, thus increasing its value.

Policy makers in Kenya should present policies that are relevant to the effect of the stock price movements, and the impact that this movement will have on the country's economy and its performance. The monetary committee in the central bank should aim to ensure that the exchange rate is stable as its stability has an effect on the stock market. A stable exchange rate motivates more foreign investors to invest in the country.

On the other hand, the Chinese government controls the Chinese Yuan. By doing this, the market will have an influence over the currency's exchange rate. Robertson (2015). China exports a lot of its goods all over the world and therefore has great returns. This means that the Chinese Yuan will manage to remain strong as compared to other major global currencies. When a government controls the amount a currency can be bought or sold, it controls the exchange rate fluctuations by limiting the currency inflows and outflows. This results in a stable economy thus greater stock returns. The Central Bank of Kenya's exchange rate policy seeks to attain long term stability. As established by this study, exchange rate stability has a direct implication on the stock market, therefore, these efforts should not be compromised. In theory, we see that exchange rates do have an effect on different macroeconomic variables such as inflation, interest rates and employment. Further studies could incorporate these macroeconomic conditions especially in developing countries, to study the effects of exchange rate fluctuations on the econ-

omy. For similar studies, research could focus on stock returns of local firms instead of internationally traded firms. Overall, further research into developing economies would provide much needed evidence and hence policy recommendations for policy makers to maintain a stable exchange rate.

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Appendices

Appendix 1: R codes used for Data Analysis

change directory

load tseries

load normtest

load lmtest

FOREX = read.csv("Exchange Rates.csv",header= TRUE)

FOREX

STOCKPRICES = read.csv("Stock Prices.csv",header= TRUE)

STOCKPRICES

CHYKES = FOREX[,c(3)]

CHYKES

CHYTSH = FOREX[,c(5)]

CHYTSH

CHYUGX = FOREX[,c(7)]

CHYUGX

KQ = STOCKPRICES[,c(3)]

KQ

KQTZ = STOCKPRICES[,c(5)]

KQTZ

KQUG = STOCKPRICES[,c(7)]

KQUG

```
KCB = STOCKPRICES[,c(9)]
KCB
KCBTZ = STOCKPRICES[,c(11)]
KCBTZ
KCBUG = STOCKPRICES[,c(13)]
KCBUG
EABL = STOCKPRICES[,c(15)]
EABL
EABLTZ = STOCKPRICES[,c(17)]
EABLTZ
EABLUG = STOCKPRICES[,c(19)]
EABLUG

TEST FOR NORMALITY: JARQUE-BERA TEST
jarque.bera.test(CHYKES)
jarque.bera.test(CHYTSH)
jarque.bera.test(CHYUGX)
jarque.bera.test(KQ)
jarque.bera.test(KQTZ)
jarque.bera.test(KQUG)
jarque.bera.test(KCB)
jarque.bera.test(KCBTZ)
jarque.bera.test(KCBUG)
jarque.bera.test(EABL)
jarque.bera.test(EABLTZ)
jarque.bera.test(EABLUG)

UNIT ROOT TEST FOR STATIONARITY: AUGMENTED DICKEY FULLER TEST
adf.test(CHYKES)
adf.test(CHYTSH)
adf.test(CHYUGX)
adf.test(KQ)
```

adf.test(KQTZ)

adf.test(KQUG)

adf.test(KCB)

adf.test(KCBTZ)

adf.test(KCBUG)

adf.test(EABL)

adf.test(EABLTZ)

adf.test(EABLUG)

TEST FOR CO-INTEGRATION: GRANGER CAUSALITY TEST

grangertest(CHYKES KQ, order = 1)

grangertest(CHYKES KCB, order = 1)

grangertest(CHYKES EABL, order = 1)

grangertest(CHYTSH KQTZ, order = 1)

grangertest(CHYTSH KCBTZ, order = 1)

grangertest(CHYTSH EABLTZ, order = 1)

grangertest(CHYUGX KQUG, order = 1)

grangertest(CHYUGX KCBUG, order = 1)

grangertest(CHYUGX EABLUG, order = 1)

Appendix 2: Descriptive Statistics from EViews

Table 4: Descriptive Statistics from EViews

Stats	Log CNY/KES	Log CNY/TZS	Log CNY/UGX	Log KQ	Log KQTZ
Mean	0.000212	0.000446	0.000508	0.000196	-0.001334
Median	0.000256	0.000240	0.000220	-0.001979	0.000000
Maximum	0.008088	0.038565	0.013713	0.370893	0.522883
Minimum	-0.008604	-0.050134	-0.014109	-0.089008	-0.694605
Std. Dev.	0.002381	0.004721	0.003614	0.033109	0.057586
Skewness	-0.349703	-2.163085	0.244916	4.884059	-3.232559
Kurtosis	4.664320	57.42591	5.996814	53.79682	88.72011
Jarque-Bera	42.50448	38875.84	120.2550	34896.02	96374.47
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	0.066243	0.139605	0.158897	-0.061303	-0.417536
Sum Sq. Dev.	0.006953	0.006953	0.004074	0.342013	1.034624
Observations	313	313	313	313	313

Stats	Log KQUG	Log KCB	Log KCBTZ	Log KCBUG	Log EABL
Mean	36.40728	0.001313	0.001038	0.001572	0.000411
Median	0.000000	0.000000	0.000000	0.000000	0.000000
Maximum	651.8400	0.063282	0.356547	0.225535	0.056883
Minimum	0.000000	-0.080520	-0.110071	-0.095301	-0.051153
Std. Dev.	116.0049	0.016111	0.027729	0.018610	0.015283
Skewness	3.849114	-0.363178	6.746079	7.362357	-0.026080
Kurtosis	18.17084	5.419403	89.57013	85.67004	4.314031
Jarque-Bera	3774.482	83.22023	100113.4	91958.78	22.55425
Probability	0.000000	0.000000	0.000000	0.000000	0.000013
Sum	11395.48	0.420828	0.325030	0.491950	0.128604
Sum Sq. Dev.	4198626.	0.080988	0.239890	0.108058	0.072870
Observations	313	313	313	313	313

Stats	Log EABLTZ	Log EABLUG
Mean	0.001357	0.001257
Median	0.000000	0.000000
Maximum	0.440122	0.275427
Minimum	-0.055951	-0.086186
Std. Dev.	0.028937	0.019893
Skewness	11.06064	10.24742
Kurtosis	170.3568	134.2929
Jarque-Bera	371656.8	230288.0
Probability	0.000000	0.000000
Sum	0.424882	0.393366
Sum Sq. Dev.	0.261258	0.123473
Observations	313	313

Appendix 3: Granger Causality

Table 5: Granger Causality Results from E Views

Null Hypothesis	Observations	F Statistic	Probability
KQ does not Granger Cause CHYKES	311	0.26054	0.6101
CHY-KES does not Granger Cause KQ		0.05799	0.8099
KCB does not Granger Cause CHYKES	311	0.00619	0.9373
CHYKES does not Granger Cause KCB		0.25873	0.6114
EABL does not Granger Cause CHYKES	311	1.76586	0.1849
CHYKES does not Granger Cause EABL		0.11828	0.7311
KQTZ does not Granger Cause CHYTSH	311	1.80670	0.1799
CHYTSH does not Granger Cause KQTZ		2.17334	0.1414
KCBTZ does not Granger Cause CHYTSH	311	0.26942	0.6041
CHYTSH does not Granger Cause KCBTZ		0.32491	0.5691
EABLTZ does not Granger Cause CHYTSH	311	3.64934	0.0570
CHYTSH does not Granger Cause EABL		0.14096	0.7076
KQUG does not Granger Cause CHYUGX	311	0.06805	0.7044
CHYUGX does not Granger Cause KQUG		0.28300	0.5951
KCBUG does not Granger Cause CHYUGX	311	0.19747	0.6571
CHYUGX does not Granger Cause KCBUG		0.68061	0.4100
EABLUG does not Granger Cause CHYTUGX	311	0.23532	0.6280
CHYTUGX does not Granger Cause EABLUG		0.26285	0.6085

Appendix 4: Graphs plots showing the trends of all the time series data

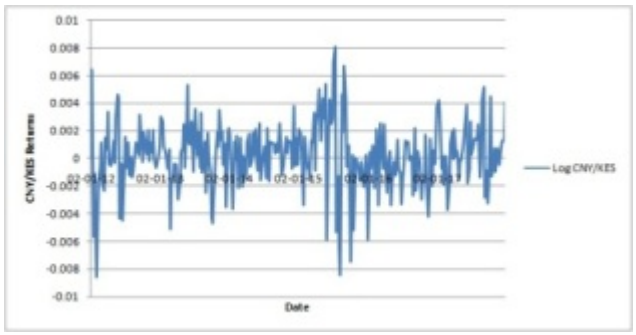

Figure 1: Plot of CNY/KES vs. Time

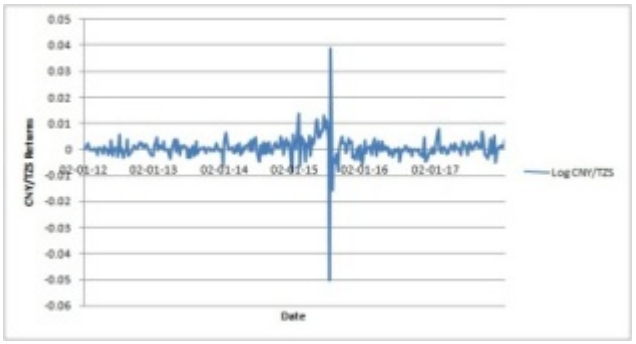

Figure 2: Plot of CNY/TZS vs. Time

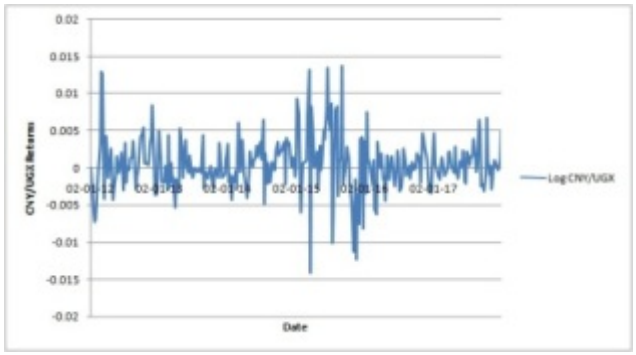

Figure 3: Plot of CNY/UGX vs. Time

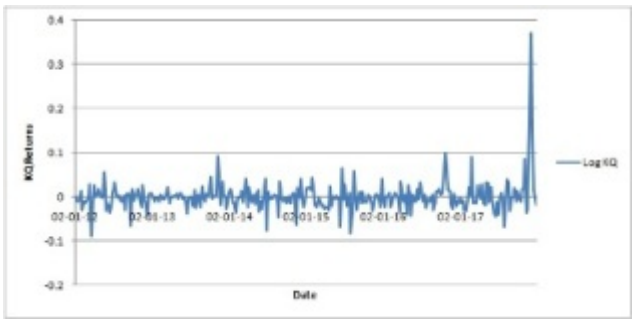

Figure 4: Plot of Log KQ vs. Time

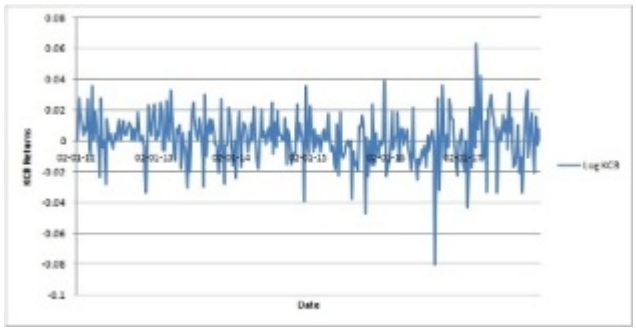

Figure 5: Plot of Log KCB vs. Time

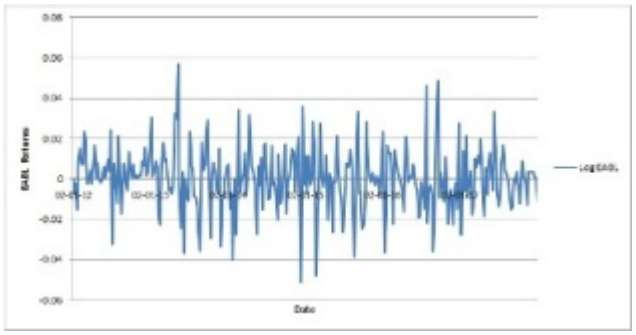

Figure 6: Plot of Log EABL vs. Time

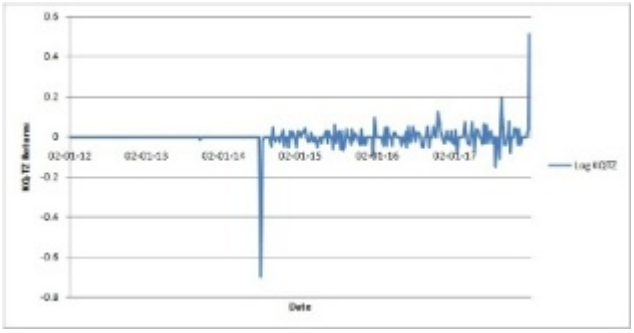

Figure 7: Plot of Log KQTZ vs. Time

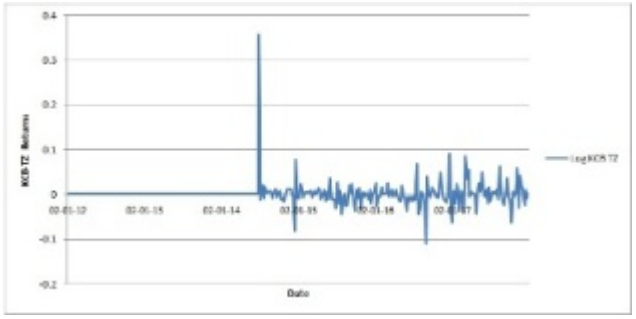

Figure 8: Plot of Log KCBTZ vs. Time

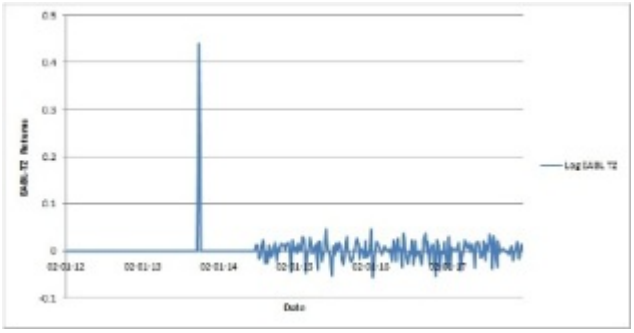

Figure 9: Plot of Log EABLTZ vs. Time

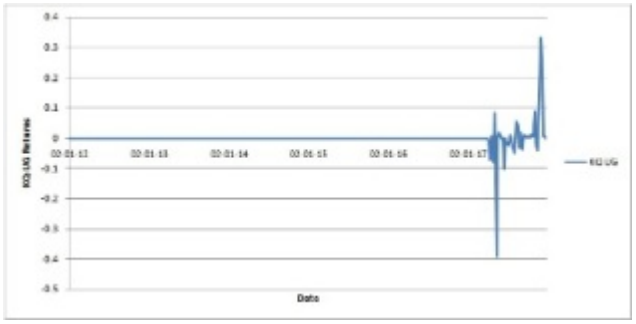

Figure 10: Plot of Log KQUG vs. Time

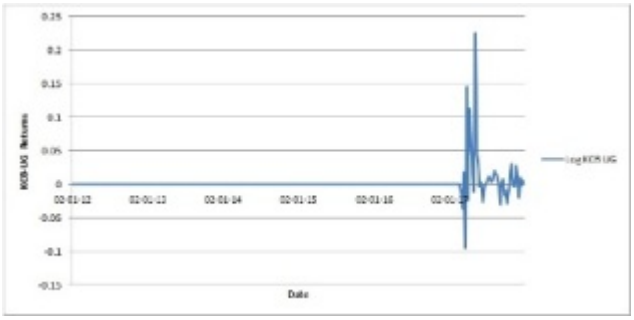

Figure 11: Plot of Log KCBUG vs. Time

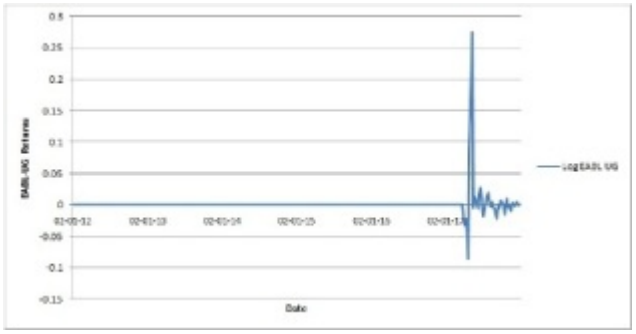

Figure 12: Plot of Log EABLUG vs. Time

Appendix 5: Graphs of the Exchange rates versus the Stock Prices

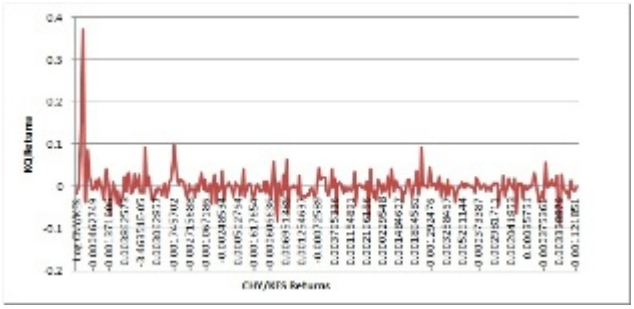

Figure 13: Plot of CHYKES vs. KQ

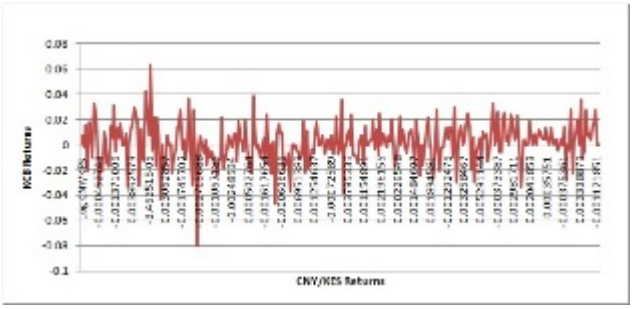

Figure 14: Plot of CHYKES vs. KCB

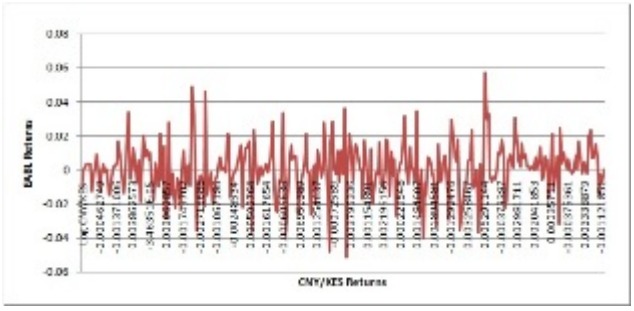

Figure 15: Plot of CHYKES vs. EABL

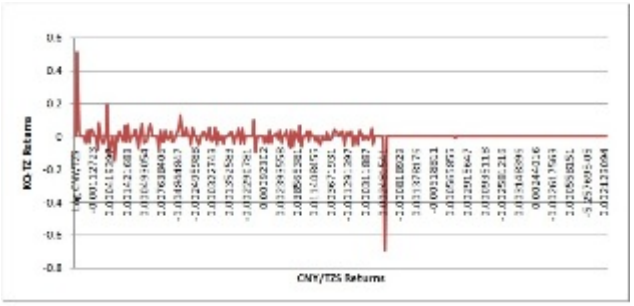

Figure 16: Plot of CHYTZS vs. KQTZ

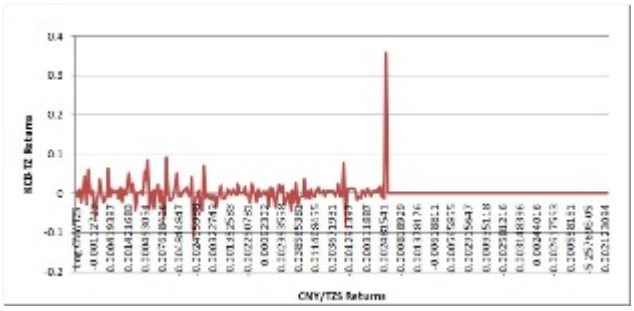

Figure 17: Plot of CHYTZS vs. KCBTZ

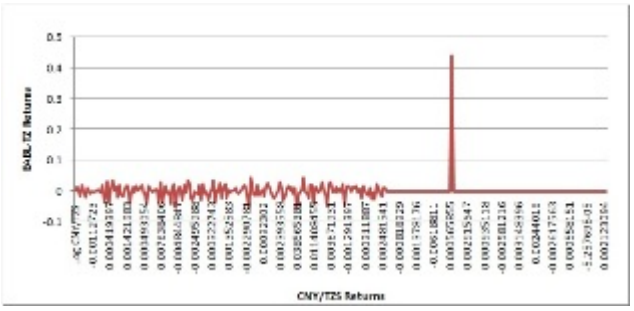

Figure 18: Plot of CHYTZS vs. EABLTZ

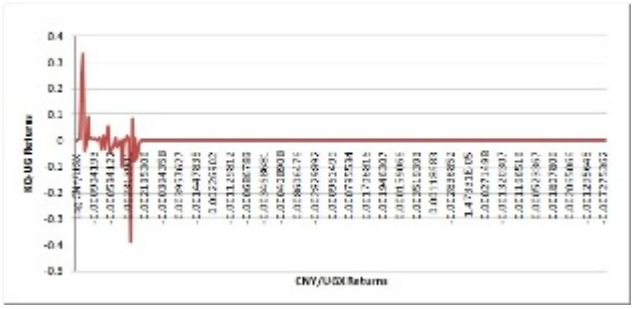

Figure 19: Plot of CHYUGX vs. KQUG

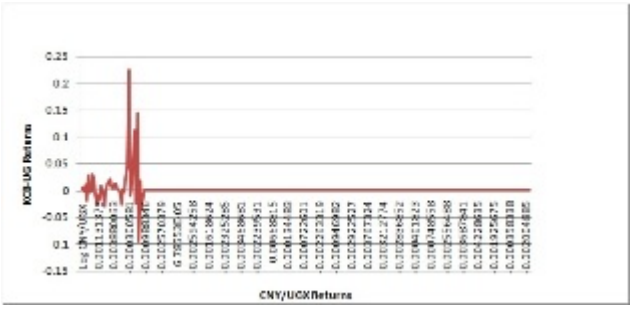

Figure 20: Plot of CHYUGX vs. KCBUG

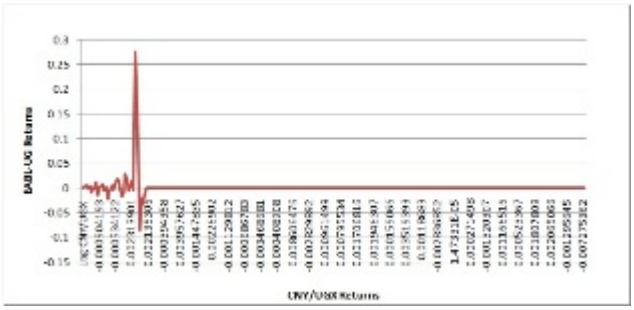

Figure 21: Plot of CHYUGX vs. EABLUG